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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/525,797  
Filing Date: February 25, 2005  
Appellant(s): KANNAN ET AL.

Steven P. Weihrouch (Reg. No. 32,829)  
For Appellants

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed April 6, 2010, appealing from the Office action mailed July 22, 2009.

**(1) Real Party in Interest**

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The following is a list of claims that are rejected and pending in the application:  
1-5, 8-12 and 17-21.

**(4) Status of Amendments After Final**

The examiner has no comment on the appellants' statement of the status of amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The examiner has no comment on the appellants' statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

**(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellants' brief.

**(8) Evidence Relied Upon**

5,837,094	TSUKAZAKI ET AL.	11-1998
5,636,287	KUBLI ET AL.	6-1997

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**Claims 1-5, 8-12 and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,837,094 to Tsukazaki, et al. (hereinafter "Tsukazaki") in view of US 5,636,287 to Kubli et al. (hereinafter "Kubli").**

Tsukazaki teaches a semiconductor manufacturing apparatus (abstract) and discloses: a processing vessel (Fig. 1, ref. 4 and col. 5, lines 31 and 32) which is fully capable of accommodating a substrate; a gas supply system (Fig. 1, ref. 8 and col. 5, line 41), which is fully capable of supplying a cleaning gas (col. 6, lines 51 and 52) or a process gas (col. 6, lines 18 and 19), into the processing vessel; an exhaustor (esp. Fig. 1, ref. 12 and col. 5, lines 48-50); an operating state detector (Fig. 1, ref. 15 and col. 5, lines 53-55); and an end point detector (Fig. 1, ref. 13 and 31 and col. 5, lines 49-51 and 59-64), or means for detecting an end point of cleaning or processing based on a detection result from the operating state detector.

Tsukazaki discloses that the exhauster includes a pump (not shown, col. 6, lines 6 and 7) and pipe (Fig. 1, ref. 12 and col. 5, lines 48-50), but does not explicitly teach the specifics of the pump or that the exhauster includes rotor blades; and discloses that the operating state detector is capable of monitoring particles, but does not explicitly teach that it is capable of detecting effects of collisions between a gas and the rotor blades. Regarding the pump, Tsukazaki discloses the desirability of being able to operate with a range of vacuum levels (col. 5, lines 30-35). Turbomolecular pumps are known in the art and advantageously provide versatility from intermediate vacuum levels to ultra-high vacuum levels. It would have been obvious to one of ordinary skill in the art at the time of the invention to include a turbomolecular pump in the exhauster of the Tsukazaki teaching with a reasonable expectation of success in order to provide a versatile range of vacuum levels. It is noted that turbomolecular pumps include rotor blades and turbines, or rotatable bodies of revolution. The rotor blades are fully capable of being used to exhaust the interior of the processing vessel by rotation of the rotor blades.

Regarding the capability of detecting effects of collisions between a gas and the rotor blades, Kubli teaches an apparatus useful for the active cancellation of noise and frequency tones emanating from rotating machinery, such as an air moving device (abstract) and discloses a means for detecting effects of collisions between a gas and rotor blades (Fig. 2B, ref. 201, incl. ref. 20, 31 and 33, Fig. 1A, ref. 30, and col. 4, lines 21-26 and col. 5, lines 11-24) (gas collision will cause vibration to emanate from the blade), which reads on the vibration detector, sound wave detector and rotation

detector; and discloses that the apparatus advantageously reduces objectionable sounds (col. 1, lines 13-15 and col. 2, lines 29-36). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the means for detecting a change in an amount of a gas that collides with the rotor blades as per the apparatus of the Kubli teaching in the operating state detector of apparatus as per the Tsukazaki teaching in order to reduce objectionable sounds. It is noted that the operating state detector of the apparatus as per the Tsukazaki/Kubli teachings is fully capable of being used to determine a change in the amount of the gas that passes through the exhauster.

Regarding claim 17 specifically, the end point detector of the apparatus as per the Tsukazaki/Kubli teachings is fully capable of being used to detect the end point of a cleaning by determining whether the amount of a gas colliding with the rotor blades stabilizes with the progress of the cleaning following a period of initial instability.

#### **(10) Response to Argument**

Regarding the only ground of rejection, and with respect to claims 1 and 8, appellants first argue that the applied art does not teach or suggest an operating state detector that detects effects of collisions between a gas and rotor blades of an exhauster so as to determine a change in an amount of or a molecular weight of the gas that passes through the exhauster since, it is alleged, the end point detection performed in Tsukazaki (US 5,837,094) detects particles that are upstream of the exhausting device of Tsukazaki (see Appeal Brief, paragraph bridging pages 14 and 15) and Kubli

(US 5,636,287) is silent regarding detecting effects of collisions between a gas and a rotor blade so as to determine a change in an amount of or a molecular weight of the gas or detecting an end point of a cleaning (see Appeal Brief, at page 15, paragraph beginning "Kubli is solely concerned").

Initially, it is noted that the present claims are directed to an apparatus, not a method. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. MPEP 2114.

The examiner maintains the position that the operating state detector of the apparatus as per the Tsukazaki/Kubli teachings is fully capable of detecting effects of collisions between a gas and rotor blades and is fully capable of being used wherein these effects are used to determine a change in the amount of the gas that passes through the exhaustor.

In response to appellants' arguments against the references individually (see Appeal Brief at page 14, last paragraph to page 15, first full paragraph), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Here, Tsukazaki discloses an operating state detector (see Office action mailed 7/22/2009 at page 3, paragraph beginning "Tsukazaki teaches") it is Kubli, not Tsukazaki, which supplies the feature a means for detecting effects of collisions



between a gas and rotor blades to be included in the operating state detector (see Office action mailed 7/22/2009, paragraph bridging pages 4 and 5).

Regarding appellants' assertion that the applied art does not teach or suggest an operating state detector that detects effects of collisions between a gas and rotor blades of an exhauster so as to determine a change in an amount of or a molecular weight of the gas that passes through the exhauster since, it is alleged, the end point detection performed in Tsukazaki detects particles that are upstream of the exhausting device of Tsukazaki (see Appeal Brief, paragraph bridging pages 14 and 15), the examiner maintains the position that the operating state detector of the apparatus as per the Tsukazaki/Kubli teachings is fully capable of detecting particles at the rotor blades (see Office action mailed 7/22/2009, paragraph bridging pages 4 and 5), which are at the exhauster, not upstream of the exhauster.

Though not considered to be germane to the issues of rejection, it is noted that operating state detector of the apparatus as per the Tsukazaki/Kubli teachings is also fully capable of detecting particles upstream of the exhausting device (see Tsukazaki at Fig. 1, ref. 12, 13, 15 and 31, col. 5, lines 48-64 and the Office action mailed 7/22/2009 at page 3, paragraph beginning "Tsukazaki teaches"), as indicated by appellants.

Regarding appellants' argument that Kubli is silent regarding detecting effects of collisions between a gas and a rotor blade so as to determine a change in an amount of or a molecular weight of the gas or detecting an end point of a cleaning (see Appeal Brief at page 15, first full paragraph), the examiner maintains the position that the operating state detector of the apparatus as per the Tsukazaki/Kubli teachings is fully

capable of detecting effects of collisions between a gas and rotor blades and is fully capable of being used wherein these effects are used to determine a change in the amount of the gas that passes through the exhauster (see Office action mailed 7/22/2009, paragraph bridging pages 4 and 5 and Kubli at Fig. 2B, ref. 201, incl. ref. 20, 31 and 33, Fig. 1A, ref. 30, and col. 4, lines 21-26 and col. 5, lines 11-24). It is noted that Kubli discloses detecting vibrations from the blades (see col. 5, lines 14-16), which reads on detecting effects of collisions between a gas and rotor blades since gas collision will cause vibrations to emanate from the blades. Assuming, *arguendo*, appellants are correct that there Kubli is silent regarding detecting the effects of such collisions so as to determine a change in an amount of or a molecular weight of the gas or detecting an end point of a cleaning, this deals with the intended use of the apparatus, rather than a patently significant structural distinction. The detection of collision effects obtained during use of the apparatus as per the Tsukazaki/Kubli teaching could be used, with more or less accuracy, to determine a change in an amount of gas that passes through the exhauster (for example, used in an algorithm wherein less vibration corresponds with less gas), as appellants have apparently discussed in the present application (see the specification at the top of page 23), but this is a feature that would properly limit a method claim, not the present apparatus claims.

Appellants next acknowledge that the art of record discloses detecting sound waves emanating from a rotating machine, but repeat the argument that it does not follow that the apparatus of the applied art is capable of detecting the effects of

collisions between a gas and a rotor blade so as to determine a change in an amount of or a molecular weight of a gas that passes through an exhauster (see Appeal Brief, paragraph bridging pages 15 and 16). As previously discussed, the examiner maintains that the apparatus is fully capable of being used to detect the effects of collisions (see Kubli at col. 5, lines 14-16, which reads on detecting effects of collisions between a gas and rotor blades since gas collision will cause vibrations to emanate from the blades). The recitation "so as to determine a change in the amount ..." is directed to an intended use, not a structural distinction.

Appellants next argue that the focus on what the apparatus of the applied art is capable of is misplaced (see Appeal Brief at page 15, first full paragraph). The examiner maintains the position that according to MPEP 2114, that focus is not misplaced. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. MPEP 2114. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Id.* Regarding appellants' assertion that the applied art does not describe modifying the detection circuits to perform the functions recited in the present claims (see Appeal Brief at page 15, first full paragraph), it is noted that the claims do not require such circuit modification. As previously discussed, the apparatus of the applied art is fully capable of perform the function of detecting the effects of collisions between exhaust gas and rotor blades (see

preceding paragraphs and Kubli at col. 5, lines 14-16). It is noted that the claims do not require that the apparatus perform the step of determining the change. "So as to" means "in order to". So, detecting the collision effects "so as to determine a change" means detecting the collision effects in order to determine a change. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The claims thus allow for this determination to be performed by the apparatus, but not limit the determination to be performed by the apparatus, i.e. the determination could be performed by an operator observing the operating state detector detection of collision effects. Whether or not the collision detection is done "so as to", i.e. "in order to", determine a change in an amount of or molecular weight of the gas is up to an operator.

Regarding appellants assertion that the legal conclusion of obviousness improperly relies on conclusory statements rather than sound reasoning with some rational underpinning since, it is asserted, nothing in the record supports the alleged conclusory statement that the apparatus of the applied art is fully capable of performing the recited functions (see Appeal Brief at page 17, last paragraph), the examiner maintains the position that the legal conclusion of obviousness is based upon sound reasoning with rational underpinning, rather than conclusory statements. See, e.g. the preceding paragraphs on the functional claim language, as well as the Office action mailed 7/22/2009, at page 3, paragraph beginning "Tsukazaki teaches" and the paragraph bridging pages 4 and 5)

Appellants next argue that the applied art provides no link between the detection of the collision effects and an end point detector since, it is alleged, an apparatus of the combined applied art would merely provide noise cancellation on an exhauster (see Appeal Brief at page 18, first full paragraph). The examiner maintains the position that the apparatus of the applied art is fully capable of performing the functions required by the present claims, as discussed in the preceding paragraphs. As to providing noise cancellation, it is noted that this feature provides a motivation for combining the references, but is not the only use that can be made of the Kubli apparatus. See, e.g., see Office action mailed 7/22/2009 at page 4, paragraph bridging pages 4 and 5, and Kubli at col. 5, lines 14-16, which disclose a sensor detecting acoustic vibrations, mechanical vibrations, or both, emanating from the blades, i.e. a means for detecting effects of collisions between a gas and rotor blades (gas collision will cause vibration to emanate from the blades).

Appellants next argue that the Office failed to articulate a motivation for modifying the apparatus of Kubli to detect an end point of a cleaning or process (see Appeal Brief, paragraph bridging pages 18 and 19). The examiner agrees with this statement and maintains that that motivation is not applicable here. The Office has not put forth modifying the Kubli apparatus to detect an end point, but rather including the Kubli apparatus in the operating state detector of the Tsukazaki apparatus (see Office action mailed 7/22/2009, paragraph bridging pages 4 and 5 and Tsukazaki at Fig. 1, ref. 15 and col. 5, lines 53-55), wherein the Tsukazaki apparatus includes an end point detector (see Office action mailed 7/22/2009, paragraph bridging pages 4 and 5 and Tsukazaki

at Fig. 1, ref. 13 and 31 and col. 5, lines 49-51 and 59-64), or means for detecting an end point of cleaning or processing based on a detection result from the operating state detector. The reduction of objectionable sounds is a motivation to combine the references, but it nevertheless results in an apparatus which is fully capable of meeting the functional language of the claims.

With respect to claims 2, 3, 9 and 10, appellants assert that these claims are patentable based upon their dependence from claims 1 and 8 and do not present further arguments (see Appeal Brief at page 19, second full paragraph). Accordingly, the examiner maintains the positions as discussed above with respect to claims 1 and 8 (that is, all discussion under the heading "(10) Response to Argument" up to this paragraph.

With respect to claims 4 and 11, appellants argue that the Office has failed to make a finding of fact with respect to the subject matter of these claims or articulate the reasoning used to reach the legal conclusion of obviousness since, it is alleged, the Office has failed to point to teachings in the applied art that disclose or suggest an operating state detector that includes a vibration detector that detects the change in the amount of or the molecular weight of gas that collides with the rotor blades by detecting a vibration of the exhauster and wherein the end point detector detects the end point based on a change in the intensity of the vibration (see Appeal Brief, paragraph bridging pages 19 and 20). The examiner maintains the position that the Office has pointed to teachings in the applied art that disclose or suggest an operating state detector that includes a vibration detector. See, e.g., the Office action mailed 7/22/2009 at page 4,

the paragraph bridging pages 4 and 5, wherein it states "Kubli...discloses a means for detecting effects of collisions between a gas and rotor blades (Fig. 2B, ref. 201, incl. ref. 20, 31 and 33, Fig. 1A, ref. 30, and col. 4, lines 21-26 and col. 5, lines 11-24) (gas collision will cause vibration to emanate from the blade), which reads on the vibration detector'). Further, the Office has pointed to teachings in the applied art that disclose or suggest an operating state detector which is fully capable of detecting an end point based on a change in the intensity of the vibration. See, e.g., the Office action mailed 7/22/2009 at page 3, the paragraph beginning "Tsukazaki teaches", wherein it states "Tsukazaki ... discloses ... an end point detector (Fig. 1, ref. 13 and 31 and col. 5, lines 49-51 and 59-64), or means for detecting an end point of cleaning or processing based on a detection result from the operating state detector'. A change in the intensity of the vibration is a detection result from the operating state detector.

With respect to claims 5 and 12, appellants make essentially the same argument for these claims as were made for claims 4 and 11, i.e. they argue that the Office has failed to make a finding of fact with respect to the subject matter of these claims or articulate the reasoning used to reach the legal conclusion of obviousness since, it is alleged, the Office has failed to point to teachings in the applied art that disclose or suggest an exhauster that includes a rotatable body of revolution for exhaust and wherein the operating state detector includes a rotation detector that detects the change in the amount of or the molecular weight of the gas that collides with the rotor blades by detecting the rotation of the body of the body of revolution (see Appeal Brief at page 20, last paragraph).

The examiner maintains the position that the Office has pointed to teachings in the applied art that disclose or suggest an exhaustor that includes a rotatable body of revolution for exhaust (see, e.g., the Office action mailed 7/22/2009, the paragraph bridging pages 3 and 4, wherein it states "...turbomolecular pumps include rotor blades and turbines, or rotatable bodies of revolution. The rotor blades are fully capable of being used to exhaust the interior of the processing vessel by rotation of the rotor blades") and wherein the operating state detector includes a rotation detector that detects the change in the amount of or the molecular weight of the gas that collides with the rotor blades by detecting the rotation of the body of the body of revolution (see, e.g., the Office action mailed 7/22/2009 at page 4, the paragraph bridging pages 4 and 5, wherein it states "Kubli...discloses a means for detecting effects of collisions between a gas and rotor blades (Fig. 2B, ref. 201, incl. ref. 20, 31 and 33, Fig. 1A, ref. 30, and col. 4, lines 21-26 and col. 5, lines 11-24) (gas collision will cause vibration to emanate from the blade), which reads on the ... rotation detector"). Rotation of the body of revolution, i.e. rotor blades, will cause acoustic vibration, mechanical vibration, or both. Further, the Office has pointed to teachings in the applied art that disclose or suggest an operating state detector which is fully capable of detecting an end point by detecting a rotation of the body or revolution. See, e.g., the Office action mailed 7/22/2009 at page 3, the paragraph beginning "Tsukazaki teaches", wherein it states "Tsukazaki ... discloses ... an end point detector (Fig. 1, ref. 13 and 31 and col. 5, lines 49-51 and 59-64), or means for detecting an end point of cleaning or processing based on a detection



result from the operating state detector'. A detection of a rotation of the body of revolution is a detection result from the operating state detector.

With respect to claim 17, the appellants first argue that the applied art does not teach or suggest determining an amount of or a molecular weight of a gas that collides with rotor blades of an exhauster, much less determining whether this amount stabilizes following a period of initial instability (see Appeal Brief at page 21, paragraph beginning "Claim 17 depends"). The examiner maintains that these features relate to intended use, rather than structural distinctions.

Appellants next assert that the legal conclusion of obviousness is a merely a conclusory statement (see Appeal Brief, paragraph bridging pages 21 and 22). The examiner maintains that the legal conclusion of obviousness is based upon the MPEP, rather than a conclusory statement. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. MPEP 2114. As previously discussed, the Office has articulated the structural features in the apparatus of the applied art.

. . With respect to claims 18 and 19, appellants assert that these claims are patentable based upon their dependence from claim 17 and do not present further arguments (see Appeal Brief at page 22, second full paragraph). Accordingly, the examiner maintains the positions as discussed above with respect to claims 17.

With respect to claims 20 and 21, the appellants assert that the Office disregarded the structure disclosed in the specification that corresponds to the means-

plus-function language in these claims since, it is alleged, the structure defined in the specification that corresponds to the "operating state detector means for detecting effects of collisions between a gas and the rotor blades so as to determine a change in an amount of or a molecular weight of the gas that passes through the exhauster" includes "a processor 84 that determines change in an amount of or a molecular weight of the gas that passes through the exhauster". The examiner maintains the position that the Office has not disregarded the structure disclosed in the specification.

Initially, it is noted that this issue is discussed here for the first time because it was raised for the first time in the Appeal Brief. Proper claim interpretation means giving the claimed means plus function limitations their broadest reasonable interpretation consistent with all corresponding structures or materials described in the specification and their equivalents including the manner in which the claimed functions are performed, as acknowledged by appellants (see the Appeal Brief at page 23, first sentence following the single-spaced recitation of the claim language "means for detecting ... operating state detector means." The specification teaches corresponding structure of the "operating state detector means" to include an operating state detector (see the present specification at, inter alia, claim 1), and the Office has pointed out that the applied art discloses an operating state detector (see, e.g., the Office action mailed 7/22/2009 at page 3, the paragraph beginning "Tsukazaki teaches"). Thus, the Office has not improperly disregarded structure disclosed in the specification. Further, the Office has pointed out how the operating state means of the applied art is fully capable of being used for detecting the gas collisions (see, e.g., the Office action mailed

7/22/200, paragraph bridging pages 4 and 5). Thus, even assuming, arguendo, that the applied art is silent regarding the operating state means including a processor, the operating state means discloses is at least an equivalent of that claimed. It is noted that the applied art does disclose a processor (see Tsukazaki at col. 13, lines 26-31).

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Eric Golightly/

Examiner, Art Unit 1714

Conferees:

/Michael Kornakov/

Supervisory Patent Examiner, Art Unit 1714

/Christopher A. Fiorilla/

Chris Fiorilla

Supervisory Patent Examiner, Art Unit 1700